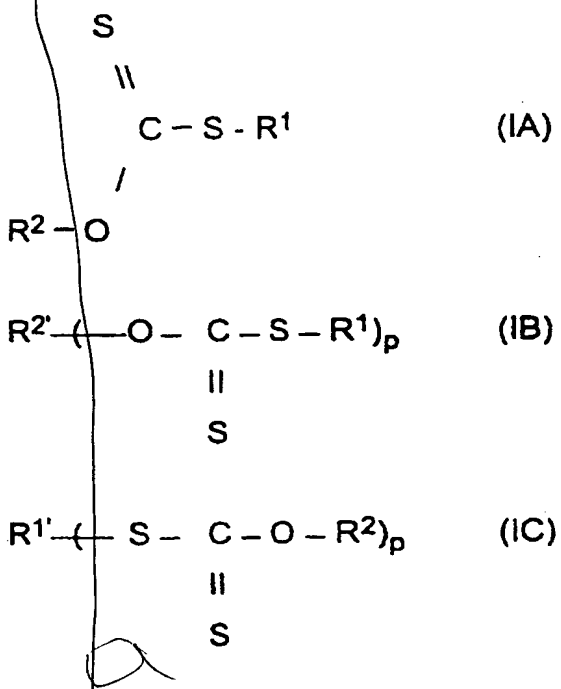
CLAIMS

1. A process for preparing polymers, characterized by bringing into contact:

- at least one ethylenically unsaturated monomer,
- at least one source of free radicals, and
- at least one compound of general formula (IA), (IB), or (IC):



(IA)

(IB)

(IC)

in which:

- R^2 and $R^{2'}$ represent:
  - an alkyl, acyl, aryl, alkene, or alkyne group (i), or
  - a carbocyclic system (ii), saturated or unsaturated, optionally aromatic, or
  - a heterocyclic system (iii), saturated or unsaturated,

these groups and cyclic systems (i), (ii), and (iii) being substituted by at least one fluorine atom, chlorine atom, and/or bromine atom,

- R^1 and $R^{1'}$ represent:

  - an alkyl, acyl, aryl, alkene, or alkyne group (i), optionally substituted,

  or

  - a carbocyclic system (ii), saturated or unsaturated, optionally substituted or aromatic,

  or

  - a heterocyclic system (iii), saturated or unsaturated, optionally substituted,

  where these groups and cyclic systems (i), (ii) and (iii) may be substituted by substituted phenyl groups, substituted aromatic groups, or: alkoxycarbonyl or aryloxycarbonyl (-COOR), carboxy (-COOH), acyloxy ($-O_2CR$), carbamoyl ($-CONR_2$), cyano (-CN), alkylcarbonyl, alkylarylcarbonyl, arylcarbonyl, arylalkylcarbonyl, phthalimido, maleimido, succinimido, amidino, guanidimo, hydroxyl (-OH), amino ($-NR_2$), halogen, allyl, epoxy, alkoxy (-OR), S-alkyl, or S-aryl groups, groups having hydrophilic or ionic character, for example the alkali metal salts of carboxylic acids, the alkali metal salts of a sulfonic

acid, polyalkylene oxide chains (PEO, PPO), or cationic substituents (quaternary ammonium salts),

R representing an alkyl or aryl group, or

- a polymer chain,

- **p** is between 2 and 10.

2. The process as claimed in the preceding claim, characterized in that R^2 and $R^{2\prime}$ are substituted by at least one fluorine atom.

3. The process as claimed in any one of the preceding claims, characterized in that R^2 represents a group of formula: $-CH_2R'^5$, in which R'^5 represents an alkyl group substituted by at least one fluorine atom, chlorine atom, and/or bromine atom.

4. The process as claimed in the preceding claim, characterized in that R^2 is selected among the following groups:

- CH_2CF_3,
- $CH_2CF_2CF_2CF_3$
- $CH_2CH_2C_6F_{13}$.

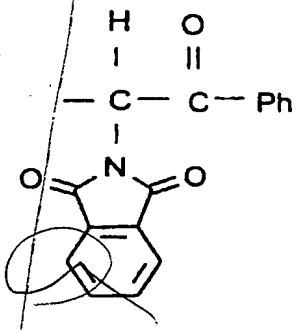
5. The process as claimed in any one of the preceding claims, characterized in that R^1 represents:

- a group of formula $CR'^1R'^2R'^3$, in which:
  - R'^1, R'^2 and R'^3 represent the groups (i), (ii), or (iii) as defined above, or
  - $R'^1 = R'^2 = H$ and R'^3 is an aryl, alkene, or alkyne group,

- or a $-COR'^4$ group in which R'^4 represents a group (i), (ii), or (iii).

6. The process according to the preceding claim, characterized in that R^1 is selected among the groups:

- $CH(CH_3)(CO_2Et)$
- $CH(CH_3)(C_6H_5)$
- $CH(CO_2Et)_2$
- $C(CH_3)(CO_2Et)(S-C_6H_5)$
- $C(CH_3)_2(C_6H_5)$



7. The process as claimed in any one of the preceding claims, characterized in that the polymerization uses a compound of formula (IA).

8. The process as claimed in the preceding claim, characterized in that the compound of formula(IA) is selected among
ethyl a-(O-heptafluorobutylxanthyl)propionate
($R^1 = CHCH_3(CO_2Et)$, $R^2 = CH_2CF_2CF_2CF_3$),
ethyl a-(O-trifluoroethylxanthyl)propionate
($R^1 = CHCH_3(CO_2Et)$, $R^2 = CH_2CF_3$), and

ethyl a-(O-tridecafluorooctanylxanthyl)propionate (R^1 = $CHCH_3(CO_2Et)$, R^2 = $CH_2CH_2C_6F_{13}$).

9. The process as claimed in any one of the preceding claims, characterized in that the ethylenically unsaturated monomer is selected among: styrene or its derivatives, butadiene, chloroprene, (meth)acrylic esters, and vinyl nitriles.

10. The process as claimed in any one of the preceding claims, characterized in that the ethylenically unsaturated monomer is selected among vinyl acetate, vinyl Versatate®, and vinyl propionate.

11. A polymer obtainable by the process which consists in bringing an ethylenically unsaturated monomer into contact with a source of free radicals and a compound of formula (IA), (IB), or (IC).

12. The polymer as claimed in the preceding claim, characterized in that it has a polydispersity index of at most 2, preferably of at most 1.5.

13. A process for preparing multiblock polymers, characterized in that the implementation of the process as claimed in one of claims 1 to 10 is repeated at least once, using:

- compared with the preceding implementation, different monomers, and
- instead of the precursor compound of formula (IA), (IB), or (IC), the block polymer from the preceding implementation.

14. A block polymer obtainable by the process as claimed in the preceding claim.

15. The block polymer as claimed in the preceding claim, characterized in that it has an index of polydispersity of at most 2, preferably of at most 1.5.

16. The block polymer as claimed in claim 11 or 12, characterized in that it has at least two polymer blocks selected among the following partners:

- polystyrene/polymethyl acrylate
- polystyrene/polyethyl acrylate,
- polystyrene/polytert-butyl acrylate,
- polyethyl acrylate/polyvinyl acetate,
- polybutyl acrylate/polyvinyl acetate
- polytert-butyl acrylate/polyvinyl acetate.

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